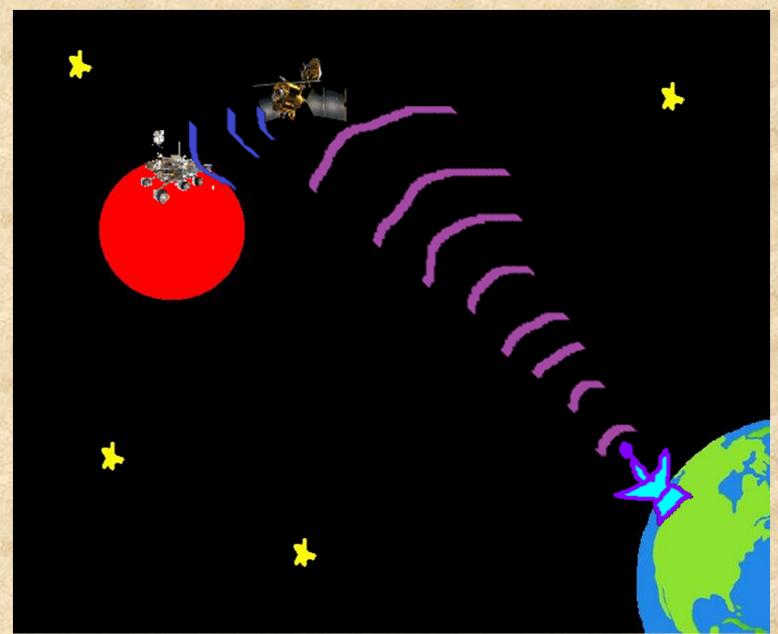# Implementing Strategic Planning Capabilities within the Mars Relay Operations Service

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California Institute of Technology
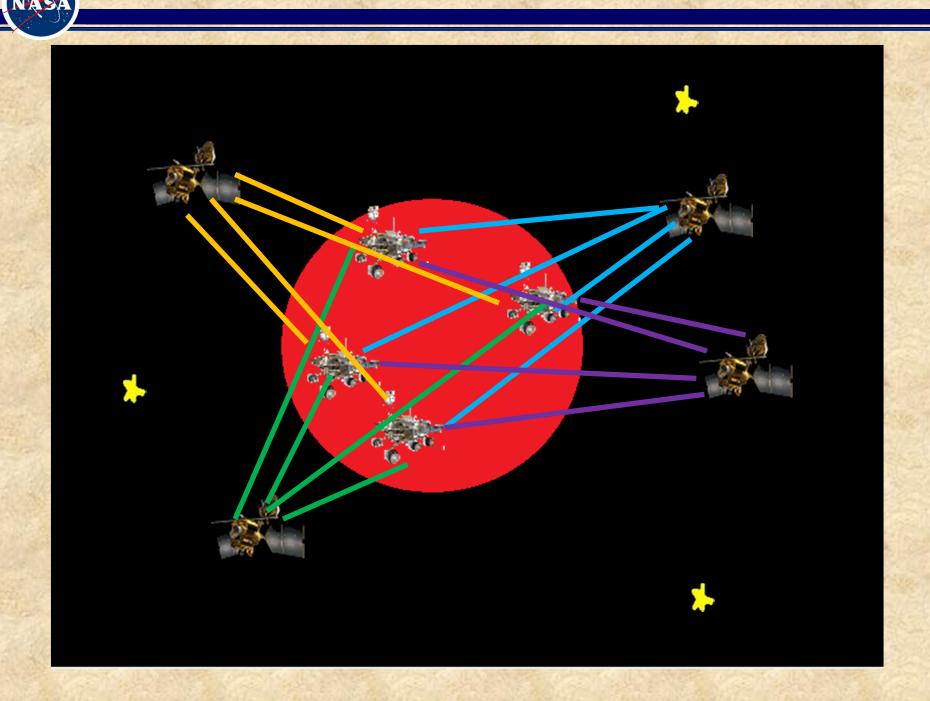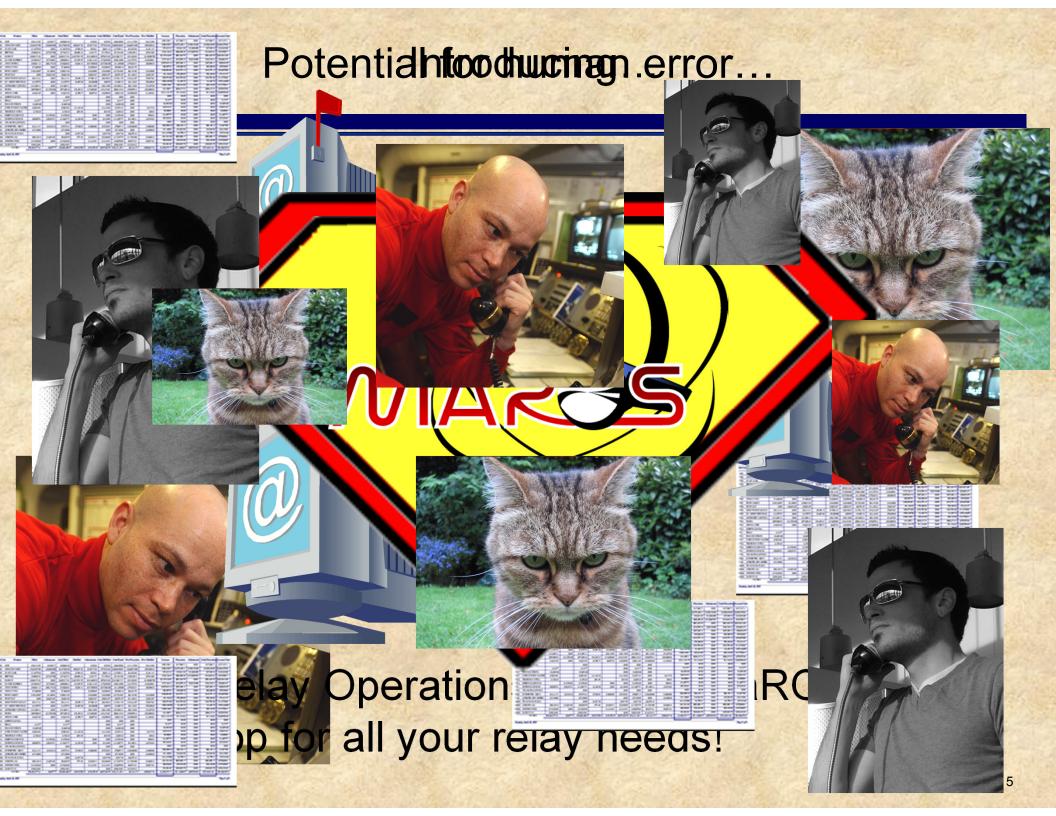
March 2011

What Is Relay?

Old Manual Method

Multiple Assets Increase Coordination Difficulty

Potential for human error…

MARS

Relay Operation... MARC

...op for all your relay needs!

MaROS Ingredients

Command Line

Server

ReSTlet

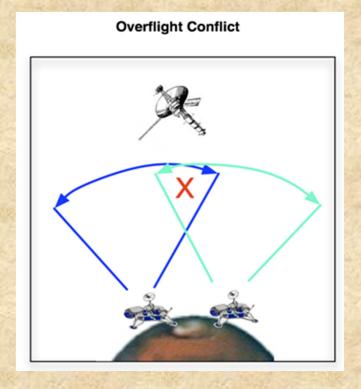**Database**

Web Browser Interface

Ingredient: Server

- Handles all business logic
  - Detects conflicts
  - Calculates latencies
- Uses MySQL to store data
- Access via Representational State Transfer(ReST)

Overflight Conflict

Ingredient: ReSTlet

- Listens for web calls
- Multiple Clients

Command Line

GUI

ReSTlet

Future Client
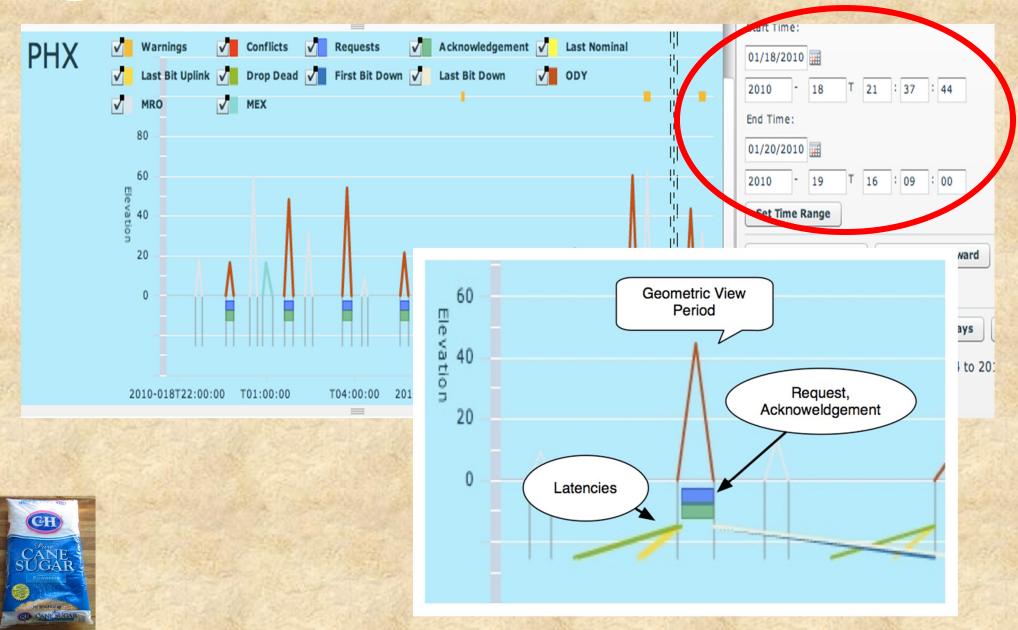
Ingredient: Command Line

- Support Legacy Machines
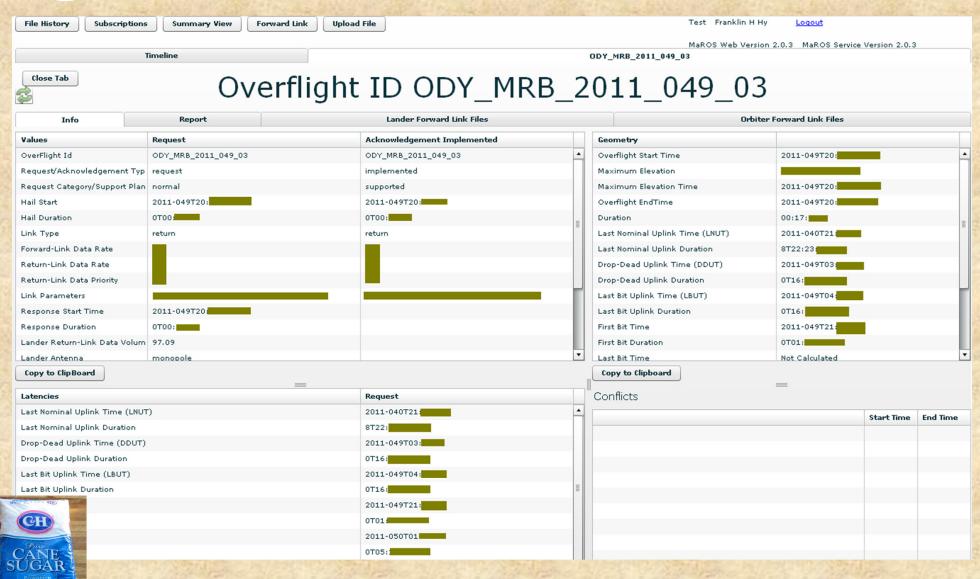- Scriptable
- Publishes/extracts data

Ingredient: GUI

Ingredient: GUI

Deployment Recipe

- Phase 1
  - Strategic
  - Accountability
- Phase 2
  - Forward Link
- Phase 3
  - Tactical

Software Development Practices

- Weekly Working Group
  - MRO, ODY, MER, MSL
  - Requirements
  - Feedback
- Scrum
  - Brief daily tagups via skype
  - Weekly meeting
  - Sprints

Conclusion

The operations teams from the ongoing missions at Mars have been generous with their time to both help plan and test a new system that will meet the future challenges of both NASA and international Mars exploration.

Throughout this development and deployment process we have followed a few guiding principles:

- Ensure ubiquitous access through ReSTful and web interfaces;

- Design a system that is mission and even planet agnostic so that future missions may be added with little hassle, and the system itself may be redeployed for other planetary relay networks;

- Accept constant input and feedback between mission operators and the development team to ensure that there is a useful product that may be used for years to come.

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Thank You!

Questions?